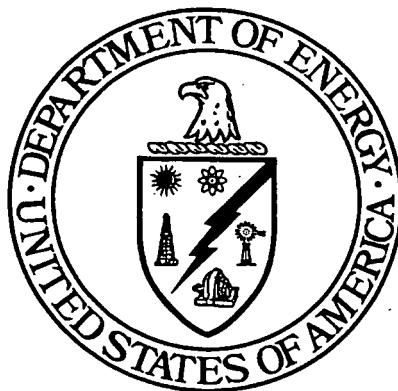


WETLAND MONITORING REPORT FOR THE YEAR 2000

AREA 1, PHASE I WETLAND MITIGATION PROJECT

**FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
FERNALD, OHIO**



FOR INFORMATION ONLY

NOVEMBER 2001

**U.S. DEPARTMENT OF ENERGY
FERNALD AREA OFFICE**

**20700-RP-0002
REVISION 0
PCN 1**

REVISION SUMMARY

<u>Revision</u>	<u>Date</u>	<u>Description of Revision</u>
Rev. 0	9-28-01	Initial controlled issuance.
PCN 1	11-26-01	Correction to incorporate Appendix J and Section 2.2 further explain the timeline for project construction and revegetation.

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2.0 WETLAND MONITORING

2.1 WETLAND MONITORING REQUIREMENTS

The EPA's Clean Water Act 404 (b)(1) Guidelines promulgated in 40 CFR Part 230 require replacement wetlands to compensate for unavoidable impacts by CERCLA activities. The specifics of the monitoring plan are outlined in the A1PI Wetland Mitigation Plan. The constructed wetlands are to be monitored during the growing season (March through October), with annual report submissions for a 5-year period to document wetland vegetation, soils, and hydrology development. By the end of the 5th monitoring year a determination will be made regarding further monitoring.

2.2 DESCRIPTION OF WETLAND MITIGATION AREA

The mitigation site is located in the northeast corner of the FEMP (Exhibit 1). The site was previously a grazed pasture and was modified during cleanup as a result of surface soil removal. During remediation, surface soil was removed from the majority of the site and a deep excavation occurred in what is now Basin 4 for the removal of radium. The mitigation area is bordered to the west by the North Access Road and on the east by the property fence. Elevations range from 620 feet to 597 feet Mean Sea Level with approximately 20 acres of receiving watershed. Surface water reaches the mitigation area by overland flow and travels through each basin by connected gravity-flow channels. All wetland basins, with the exception of Basin 8 (wet prairie), were designed to contain open, palustrine emergent features. Flow in the wetland system is as follows: Basin 8 flows south through Basins 7 and 6 into Basin 1; Basin 5 flows to the east into Basin 1; Basin 4 flows north through Basins 3 and 2 into Basin 1; and Basin 1 outfalls to the east off of the Fernald Site.

The Wetland Mitigation Project in A1PI was initiated in March 1999. Initial project activities included the salvage of existing plant material from the project area and surveying and staking to prepare for grading. The majority of the project area had been previously remediated resulting in the removal of the top 6 inches of topsoil. The northern portion of the project area was not remediated and still contained the original topsoil. Grading in the project area began in mid-March 1999 with the stockpiling of topsoil from the northern end of the project. Excavation began in the northern end of the project with the creation of Basin 8. Grading activities progressed to the south with the creation of Basins 6 and 7. Grading then moved to the southern end of the project with the creation of Basins 1 through 5. Each basin was proctor tested to ensure proper compaction of the basins and swales and ponds contained

within. Concrete headwall structures were installed to control flow out of Basins 2, 3, and 6. Existing stockpiled topsoil was used to cover Basins 2, 6, 7, and 8. The use of amendments was required to create topsoil in the remainder of the Basins. The top layer of soil on Basin 1 was mixed with composted sewage sludge as a soil amendment. Basins 3 and 4 received a combination of wood chips and sawdust mixed with the surface soil. Basin 5 received only wood chips. Grading and soil amendment activities were complete in May 1999.

PCN 1 Planting activities were initiated in April 1999 in parallel with grading activities. Planting in Basins 6, 7 and 8 and a portion of Basin 4 was largely complete by early June. Planting was suspended during the summer months and resumed in early October. Planting was largely complete in the Fall of 1999 with a small number of trees and shrubs installed in the Spring of 2000 due to plant availability. Approximately 3,300 trees and shrubs were installed in the wetland in all. Wildlife boxes, shallow monitoring wells and gooseline to protect wetland plugs were also installed as part of the project activities.

2.3 CHARACTERISTICS OF EACH WETLAND BASIN

2.3.1 Basin 1

Basin 1 is approximately 1.02 acres and is situated at the lowest elevation of the mitigation area (see Appendix A, Photographs 9 through 11). Hydrology is a combination of natural drainage and collection of drainage from all basins, with the outlet releasing water to an off-property swale. Water control devices consist of a buried log and coir fabric structure at the outlet and a pole drain, which receives a slow seep from Basin 5. Conduits installed in Basin 1 also allow flow from a perched water zone below the Basin. Pre-cast concrete headwalls allow water retention and controlled water release from Basins 2 and 6. During construction, soil in Basin 1 was amended with composted municipal sewage sludge. Wetland classification types designed for this basin consist of wet forest, shrub swamp, herbaceous meadow and open water.

2.3.2 Basin 2

Basin 2 is approximately 1.29 acres and is situated above Basin 1 and below Basin 3 (see Appendix A, Photographs 12 through 14). Hydrology is a combination of natural drainage and collected drainage from Basins 3 and 4. Flow also enters the basin from a ditch that runs parallel to the North Access Road on the west side of the wetland. Water control devices consist of pre-cast concrete headwalls at the inlet and outlet to allow water retention and controlled flow through the meandering channel of this basin.

Topsoil stockpiled during initial construction activities was used to cover Basin 2. Wetland classification types designed for this basin consist of wet forest, shrub swamp, herbaceous meadow, wet prairie, and open water.

2.3.3 Basin 3

Basin 3 is approximately 0.83 acres and is situated above Basin 2 and below Basin 4 (see Appendix A, Photographs 15 through 17). Hydrology is a combination of natural drainage and collected drainage from Basin 4. Water control devices consist of a log and coir fabric structure at the inlet and a pre-cast concrete headwall at the outlet to allow water retention and controlled flow through the meandering channel of this basin. Wood chips and sawdust were used to amend the soil in Basin 3. Wetland classification types designed for this basin consist of wet forest, shrub swamp, herbaceous meadow and open water.

2.3.4 Basin 4

Basin 4 is approximately 0.81 acres and is situated above Basin 3, placing Basin 4 at the highest elevation of the project (see Appendix A, Photographs 18 through 20). Hydrology includes drainage from the area immediately north of the wetland and natural drainage to the meandering channel with a log and coir fabric structure at the outlet to allow water retention prior to releasing flow to Basin 3. Wood chips and sawdust were used to amend the soil in Basin 4. Wetland classification types designed for this basin consist of shrub swamp, herbaceous meadow and open water.

2.3.5 Basin 5

Basin 5 is approximately 0.23 acres and situated adjacently west of Basin 1 (see Appendix A, Photograph 8). Hydrology is a combination of natural drainage, a drainage ditch on the west side of the wetland, and a culvert under the road, which accepts drainage from the west side of the road. Water control devices consist of a pole drain to provide water retention by allowing a slow gradual seep to Basin 1 and an emergency spillway lined with coir fabric. Wood chips were used to amend the soil in Basin 5. Wetland classification types designed for this basin consist of open water, shrub swamp and future development of herbaceous meadow.

2.3.6 Basin 6

Basin 6 is approximately 1.44 acres and is situated above Basin 1 and below Basin 7 (see Appendix A, Photographs 5 through 7). Hydrology is a combination of natural drainage, pole drains installed to allow flow from underground drain tiles, and collected drainage from Basin 7. Water control devices consist of a log and coir fabric structure at the inlet and a pre-cast concrete headwall at the outlet to allow water retention and controlled flow through the meandering channel of this basin. Topsoil stockpiled during initial construction activities was used to cover Basin 6. Wetland classification types designed for this basin consist of wet forest, shrub swamp, herbaceous meadow, wet prairie, and open water.

2.3.7 Basin 7

Basin 7 is approximately 0.48 acres and is situated above Basin 6 and below Basin 8 (see Appendix A, Photographs 2 and 3). Hydrology is a combination of natural drainage, pole drains installed to allow flow from underground drain tiles, and collected drainage from Basin 8. Inlet drainage is from a coir fabric covered swale connecting Basin 8 and the outlet is a log and coir fabric structure, which allow water retention and water flow through the forked channel of this basin. Topsoil stockpiled during initial construction was used to cover Basin 7. Wetland classification types designed for this basin consist of wet forest, shrub swamp, herbaceous meadow, wet prairie, and open water.

2.3.8 Basin 8

Basin 8 is approximately 0.14 acres and is situated above Basin 7 (see Appendix A, Photograph 1). Hydrology is from natural drainage, which is collected and released through a coir fabric covered swale to Basin 7. Topsoil stockpiled during initial construction was used to cover Basin 8. Wetland classification types designed for this basin consist of shrub swamp and wet prairie.

2.4 WETLAND MONITORING METHODS

2.4.1 Woody Species

Each individual forest and shrub patch was systematically assessed for mortality (Appendix B). The criteria for mortality was 50 percent leaf cover in the canopy for trees and 50 percent leaf cover of the original shrub planting. Specimens not meeting these criteria were determined to be dead and were counted and recorded. Those woody plants which did not survive were computed against the total number of plants in each respective patch as outlined in the wetland design to determine if survival requirements were met.

The A1PI Wetland Mitigation Plan contains survival requirements of 80 percent. If survival requirements were not met then replacement stock of the same specifications as the original material or by substitution (unavailability of stock) were required. Replacement planting was implemented using an approved strategy by the Agencies and Natural Resource Trustees (NRTs) (August 31, 2000 letter). This strategy allowed some patches to remain below 80 percent survival to focus on other patches most deficient in cover, food source and buffering as agreed upon by the Agencies and NRTs. The replacement strategy placed priority on wetland patches to achieve survival requirements, however, some wetland patches were not planted due to inaccessibility. The upland patches were replanted based on the need for buffer establishment along the western portion of the project. The second year of mortality counts will be based upon the current status of each upland and wetland planting patch (Appendix C), which is resultant of the replanting effort in Fall 2000. Patches which were not replanted and did not experience survival rates below 80 percent, will not be monitored after the second year in accordance with the A1PI Wetland Mitigation Plan. All patches which are replanted will be monitored for at least two growing seasons beyond the date of replacement to ensure the 80 percent survival rate is met. Patches which do not achieve survival requirements will be assessed for replacement planting based on the revised planting strategy outlined in Section 2.5.

2.4.2 Herbaceous Species

Cover estimates for herbaceous meadow and wet prairie communities were conducted at the end of the growing season (October) and are discussed in Section 2.5.2 and Appendix E. Cover estimates of upland prairie communities were not conducted due to little or no cover as a result of the 1999 drought. A walking survey of each basin was conducted using visual estimates of the amount of basin area covered by a perpendicularly projected outline of native vegetation. Individual patches were difficult to distinguish and were not assessed due to impacts of the drought on the germination of marsh and wet prairie seed mixes specified in the design, resulting in invasion of aggressive species within the bottom of most basins. Cover estimates will assess each basin area using the following categories: 0 to 5 percent (sparse); 5 to 25 percent (medium-sparse); 25 to 50 percent (medium); 50 to 75 percent (medium-dense); 75 to 100 percent (dense) (Daubenmire 1959).

Stereographic photographs were not taken due to logistical difficulties associated with a large number of patches not meeting the 80 percent cover requirements and the difficulty of distinguishing patches.

2.4.3 Water Levels

Basin water level depths were measured monthly from March through October 2000. A staff gauge was manually inserted in the shallow portions of Basins 1, 2 and 4 to measure water levels to ensure the basins are capable of supporting continued maturation of the wetland system. Staff gauges were placed in deeper pools of water contained in Basins 1, 2 and 4 to monitor water levels. These locations were selected because water is expected to persist in these pools year-round and other pools are designed to dry-up for portions of the year. Sampling locations are identified on the map found in Appendix F.

To assess the water table depth, shallow monitoring wells constructed of 1-inch Schedule 40 polyvinyl chloride (PVC) pipe were installed in the top 18 inches of each basin. Water table depths were measured monthly from March through October 2000 using a water level meter with an alarm system. Results of the water level monitoring can be found in Section 2.5.3 and Appendix F.

2.4.4 Water Quality

Samples were collected bi-monthly (March through September) from Basins 1, 2, 4, 5 and 6, where perennial ponding was expected. Each sample was collected by submerging a polyethylene dipper into the water in a manner to avoid disturbing sediment from the basin bottom. The water was transferred to a stainless steel beaker until enough water was collected for measurement. A Horiba® U-10 Water Quality Probe was submersed in the beaker until such time parameters were stabilized. Parameters measured included pH, dissolved oxygen, conductivity, temperature, turbidity, odor and color. Results of water quality sampling is presented in Section 2.5.4 and Appendix G.

2.4.5 Wetland Soils

Soils in each of the wetland basins were amended with organic material (woodchips, sawdust, bio-solids). Starting in monitoring year 2001, soil samples will be taken annually at appropriate depths from two locations in each basin during the month of May and compared to Munsell color charts. These sample areas will be representative of non-hydric conditions and will be marked to monitor development of hydric soils. Further discussion of soil sampling to be carried out in 2001 is provided in Section 2.5.5.

2.4.6 Wildlife Observations

Visual and auditory observations were made throughout the growing season and recorded. Birds and mammals were the main emphasis with notations of herptofauna. Aquatic macroinvertebrates will be

sampled in May and June 2002 for indicator species of water quality. The results of the wildlife observations are provided in Section 2.5.6 and Appendix H.

2.4.7 Infrastructure Inspection and Maintenance

All structures such as goose fence, pole drains, headwalls were inspected, maintained, or dismantled as warranted. Invasive and exotic plant species were removed as necessary. More discussion is provided in Section 2.5.7.

2.4.8 Weather Conditions

Monthly precipitation data obtained from the FEMP Meteorological Tower for 1999 (project implementation) and 2000 (monitoring year) are summarized in Tables 2-1 and 2-2. Tables 2-1 and 2-2 also contain Palmer Drought Severity Index information. The drought of 1999 was classified as mild in May, moderate in September, severe in July and August and extreme in September (Table 2-1). This resulted in mortality of woody stock, invasion of herbaceous species in the bottom of the basins and inhibition of germination of the emergent seed mixes.

TABLE 2-1
1999 PRECIPITATION DATA (IMPLEMENTATION)

Month	Average Rainfall (in.)	Monthly Precipitation (in.)	Departure from Normal (in.)	Palmer Drought Severity Index
January	2.59	4.95	+2.36	+0.4
February	2.69	4.01	+1.32	+1.1
March	4.24	2.03	-2.21	-0.7
April	3.75	3.67	+0.08	-1.1
May	4.28	1.64	-2.64	-1.9
June	3.84	4.90	+1.06	-2.9
July	4.24	1.75	-2.49	-3.2
August	3.35	2.37	-0.98	-3.5
September	2.88	1.12	-1.76	-4.0
October	2.86	2.46	-0.4	-3.0
November	3.46	2.05	-1.41	-3.1
December	3.15	3.44	+0.29	-3.5

Above +4 = extreme moist spell
3.0 to 3.9 = very moist spell
2.0 to 2.9 = unusual moist spell
1.0 to 1.9 = moist spell
0.5 to 0.9 = incipient moist spell
0.4 to -0.4 = near normal

-0.5 to -0.9 = incipient drought
-1.0 to -1.9 = mild drought
-2.0 to -2.9 = moderate drought
-3.0 to -3.9 = severe drought
Below -4.0 = extreme drought

TABLE 2-2
2000 PRECIPITATION DATA MONITORING

Month	Average Rainfall (in.)	Monthly Precipitation (in.)	Departure from Normal (in.)	Palmer Drought Severity Index
January	2.59	4.69	+2.1	-2.5
February	2.69	4.84	+2.15	-0.9
March	4.24	4.00	-0.24	-1.2
April	3.75	4.66	+0.91	-1.0
May	4.28	3.83	-0.45	-2.3
June	3.84	4.07	+0.23	-1.5
July	4.24	2.78	-1.46	-1.0
August	3.35	2.21	-1.14	-1.0
September	2.88	3.62	+0.74	+1.1
October	2.86	3.32	+0.46	+0.6
November	3.46	3.32	-0.14	+0.9
December	3.15	3.40	+0.25	+1.2

Above +4 = extreme moist spell
3.0 to 3.9 = very moist spell
2.0 to 2.9 = unusual moist spell
1.0 to 1.9 = moist spell
0.5 to 0.9 = incipient moist spell
0.4 to -0.4 = near normal

-0.5 to -0.9 = incipient drought
-1.0 to -1.9 = mild drought
-2.0 to -2.9 = moderate drought
-3.0 to -3.9 = severe drought
Below -4.0 = extreme drought

The precipitation data indicates normal precipitation during the spring season, with a dry summer season approximately 2.37 inches below normal, requiring watering of woody stock exhibiting signs of survival (Table 2-2). Above normal conditions in the fall season provided moist soil conditions for fall replacement planting.

2.5 WETLAND MONITORING RESULTS

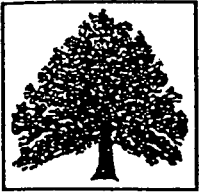
2.5.1 Woody Species

Trees and shrubs planted in each basin are included in Appendix C. Factors such as the drought of 1999 and deer pressure inhibited plant survival of some areas (< 80 percent) and necessitated replacement planting in Fall 2000. Deer damage was assessed during the first year of plant installation (August through October 1999) for browsing and rubs. Approximately 39 percent of plants were browsed, resulting in varying degrees of damage. An additional 4 percent were damaged (bark scrapes) due to rubs and 17 percent were destroyed.

The replanting strategy deviated from the original individual patch replacement by using an adaptive management approach. The replanting strategy is provided in Appendix J. This strategy focused on the

APPENDIX J

REPLANTING STRATEGY



Department of Energy 4024



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AUG 31 2000

Mr. James A. Saric, Remedial Project Manager
U.S. Environmental Protection Agency
Region V, SRF-5J
77 West Jackson Boulevard
Chicago, Illinois 60604-3590

DOE-0967-00

Mr. Tom Schneider, Project Manager
Ohio Environmental Protection Agency
401 East 5th Street
Dayton, Ohio 45402-2911

Mr. Bill Kurey
U.S. Fish and Wildlife Service, Suite H
6950 American Parkway
Reynoldsburg, Ohio 43068

Dear Mr. Saric, Mr. Schneider, and Mr. Kurey:

**TRANSMITTAL OF THE PROPOSED STRATEGY FOR REPLACEMENT PLANTING IN THE
AREA 1, PHASE I WETLAND MITIGATION PROJECT**

The purpose of this correspondence is to propose a strategy for the replacement planting required in the Area 1, Phase I Wetland Mitigation Project. The Wetland Mitigation Project was initiated in the Spring of 1999 in the northeast corner of the Fernald site. The project was completed in the Fall of 1999, and monitoring efforts began in the Spring of 2000 per the Wetland Mitigation Design. Monitoring activities consisted of the measurement of water levels within each basin, water quality analyses, mortality counts of woody stock, and wildlife observations. Maintenance has also been performed and has consisted of invasive plant species control, erosion control and watering of plants.

The first year of monitoring is near completion and indicates that replacement planting will be required in the Fall of 2000 and the Spring of 2001 to achieve minimum survival requirements of 80 percent. Further, some replacement planting will be required due to a lack of plant stock availability prior to completion of the project. Portions of this

Mr. James A. Saric
Mr. Tom Schneider
Mr. Bill Kurey

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AUG 31 2000

ecosystem are lacking in function due to a combination of a severe drought in 1999 and installation of some woody and herbaceous species beyond the ideal "planting window." Significant efforts were taken to keep plant material watered during the drought of 1999 and average survival in the Wetland Project is approximately 70 percent.

The proposed replanting strategy slightly deviates from the individual patch replacement proposed in the wetland design. This strategy involves conducting replacement planting in the wetland forest and wetland shrub areas to bring the number of surviving plants up to the minimum required in the design. The remaining replanting efforts will focus on upland areas exhibiting a deficiency in function. Functional categories to be assessed for replacement are cover, mast, diversity, aesthetics and fruit. For instance, due to space constraints not anticipated during project design, post-construction conditions have provided narrow and confined accessibility along the northern portion of the east perimeter of the project, limiting the ability to provide adequate buffering. However, the eastern perimeter of the project to the north already contains adequate buffering from the existing tree line along the fence. Planting would be most beneficial by concentrating on upland buffer establishment along the western portion of the project that requires more buffering to provide isolation for the system.

Replacement planting will include the installation of approximately 206 trees and 473 shrubs during the Fall of 2000 and the Spring of 2001 depending on availability of plant material. Plant species and locations of installation are provided in the enclosed tables and maps. The installation of 679 additional trees and shrubs will bring the total plant material surviving in the wetland up to the minimum required 80 percent of the number proposed in the wetland design. It is expected that most of the plant material can be acquired and installed in the Fall of 2000; however, some planting may be necessary in the spring due to the availability of plant material.

Please provide concurrence with this proposal by September 8, 2000 so that plant material can be ordered and deliveries arranged. Any questions on this proposal should be directed to Pete Yerace at (513) 648-3161.

Sincerely,



Johnny W. Reising
Fernald Remedial Action
Project Manager

FEMP:Yerace

Enclosure

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Mr. James A. Saric
Mr. Tom Schneider
Mr. Bill Kurey

cc w/enclosure:

R. J. Janke, OH/FEMP
W. Pasko, OH/FEMP
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G. Jablonowski, USEPA-V, SRF-5J
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P. Dunn, FCAB
D. Sarno, FCAB
F. Bell, ATSDR
F. Hodge, Tetra Tech
M. Schupe, HSI GeoTrans
R. Vandegrift, ODH
AR Coordinator, Fluor Fernald, Inc./78

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D. Carr, Fluor Fernald, Inc./2
J. Chiou, Fluor Fernald, Inc./52-0
T. Hagen, Fluor Fernald, Inc./65-2
J. Harmon, Fluor Fernald, Inc./90
S. Hinnefeld, Fluor Fernald, Inc./31
M. Jewett, Fluor Fernald, Inc./52-2
C. Straub, Fluor Fernald, Inc./65-2
H. Swiger, Fluor Fernald, Inc./65-2
T. Walsh, Fluor Fernald, Inc./65-2
E. Woods, Fluor Fernald, Inc./65-2
ECDC, Fluor Fernald/52-7

Section 1

Patch	No. Planted	No. Dead	% Survival	No. Plants to be Installed Fall 2000
UF1	9	3	67%	5
UF2	36	26	28%	0
UF3	19	11	42%	16
UF4	14	2	86%	5
US1	14	1	93%	0
US2	35	17	51%	0
US3	116	51	56%	0
US4	15	2	87%	0
US5	27	11	59%	0
US6	10	1	90%	0
US7	20	10	50%	13
US8	25	11	56%	9
US9	14	8	43%	0
US10	14	10	29%	0
US11	63	26	59%	32
US12	44	14	68%	0
US13	43	22	49%	20
US14	40	22	45%	20
WF1	19	10	47%	10
WF2	17	7	59%	4
WF3	25	15	40%	20
WF4	32	10	69%	8
WF5	27	10	63%	10
WS1	24	8	67%	8
WS2	21	3	86%	16
WS3	27	0	100%	0
WS4	26	15	42%	12
WS5	54	1	98%	0
WS6	27	0	100%	0
WS7	25	18	28%	16
Totals	882	345	61%	224

Section 2

Patch	No. Planted	No. Dead	% Survival	No. Plants to be Installed Fall 2000
UF5	27	11	59%	5
UF6	26	4	85%	0
UF7	56	15	73%	3
UF8	39	11	72%	0
UF9	79	23	71%	0
US15	16	3	81%	0
US16	26	2	92%	0
US17	63	19	70%	12
US18	59	15	75%	25
US19	21	2	90%	0
US20	65	11	83%	0
US21	52	13	75%	0
US22	53	6	89%	0
US23	37	6	84%	0
US24	23	4	83%	0
WF6	23	6	74%	0
WF7	35	9	74%	7
WF8	31	3	90%	0
WF9	39	11	72%	5
WS8	14	0	100%	0
WS9	162	44	73%	20
WS10	54	19	65%	11
WS11	14	0	100%	0
WS12	27	0	100%	0
WS13	35	18	49%	18
WS14	39	20	49%	16
WS15	27	2	93%	0
WS16	41	0	100%	0
WS17	147	47	68%	27
Totals	1330	324	76%	149

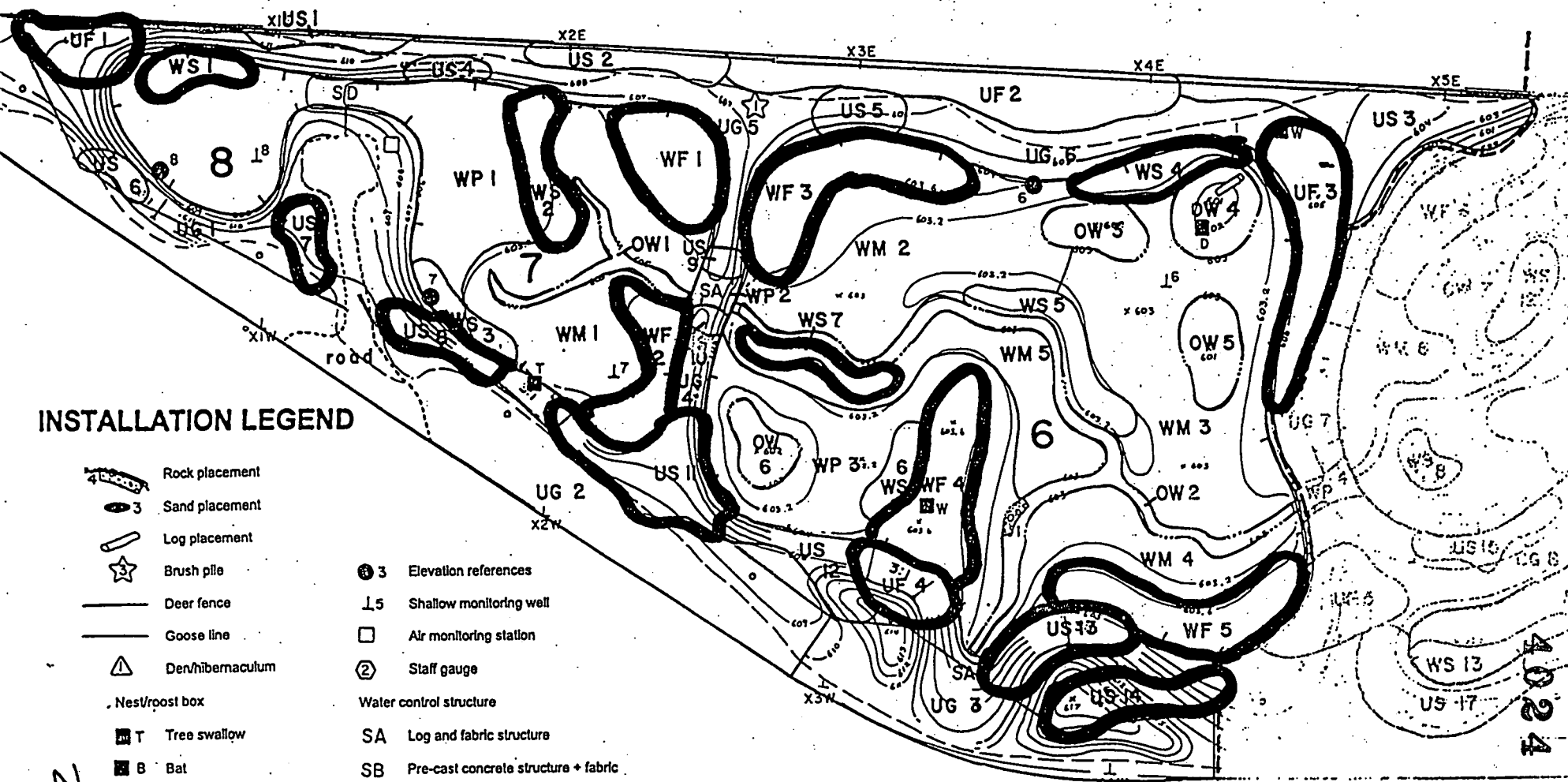
Section 3

Patch	No. Planted	No. Dead	% Survival	No. Plants to be Installed Fall 2000
UF10	17	14	18%	8
UF11	57	28	51%	23
UF12	68	29	57%	0
UF13	49	18	63%	0
UF14	54	39	28%	29
UF15	26	6	77%	0
UF16	6	3	50%	5
US25	51	17	67%	12
US26	34	11	68%	12
US27	51	16	69%	11
US28	80	29	64%	41
US29	21	2	90%	0
US30	46	22	52%	22
US31	27	11	59%	30
WF10	29	6	79%	36
WS18	38	9	76%	10
WS19	75	24	68%	51
WS20	33	3	91%	0
WS21	27	0	100%	0
WS22	14	0	100%	0
WS23	67	12	82%	0
WS24	55	6	89%	0
WS25	30	2	93%	0
WS26	27	0	100%	0
WS27	44	13	70%	15
Totals	1026	320	69%	305
Gd. Totals	3238	989	69%	678
(Denotes average %)				

SECTION 1



— DENOTES FALL 2000 PLANTING

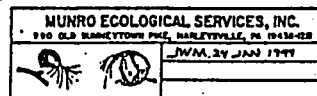


INSTALLATION LEGEND

- Rock placement
- Sand placement
- Log placement
- Brush pile
- Deer fence
- Goose line
- Den/hibernaculum

- 3 Elevation references
- 15 Shallow monitoring well
- Air monitoring station
- 2 Staff gauge
- Water control structure
- SA Log and fabric structure
- SB Pre-cast concrete structure + fabric
- SC Pole drain + fabric
- SD Fabric only

- Nest/roost box
- T Tree swallow
- B Bat
- D Wood duck
- K Kestrel
- W Wren



SECTION 1 SECTION 2

20

4024

